

# Meadowbrook Water System Intertie Feasibility Study

Prepared for  
Merced Irrigation District

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## Keebkwm hab Homphaj Kawm

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- Tau nyaj lug ntawm 2017 tsaab Proposition 1, Cov Nyaj Saib Txug Dlej, lug ntawm GSAs.
- Homphaj ntawm pob nyaj yog paab GSAs them hab npaaj tswvyim hab/ paab txim khu dlej.
- Saib kev txuas dlej ntawm Meadowbrook water tim Atwater losyog huv Merced city water system

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# Meadowbrook Water System

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Tswvcuab: California American Water Company txij xyoo  
2017

Thaajchaw Dlaav: 3.5 square miles huv Merced County

Cov Tuabneeg Siv Dlej/Customers: 5,640 tug pejxeem  
1,670 tug ntsuag dlej ntawm 57 lub commercial  
chaw txuas

Cov Qhovdlej huv  
Qaabaav Tseem  
Najnub Siv:

Qhovdlej 4	Qhovdlej 5	Qhovdlej 6	Taagnrho
1,800 gpm	630 gpm	1,160 gpm	3,590 gpm

Chaw ntim dlej: Tsi muaj chaw khaws ntim dlej

# Meadowbrook Water System

Tshuaj Faajseeb  
Thaum Titeg Titaw:

Nwg nuav muaj peevxwm txuas siv cov tshuab generators kws nqaa moog lug tau. Qhovdlej 4 yuav muaj lub generator kws txuas kag nrug.

Qheb Muaj Zug:

40 txug 60 psi

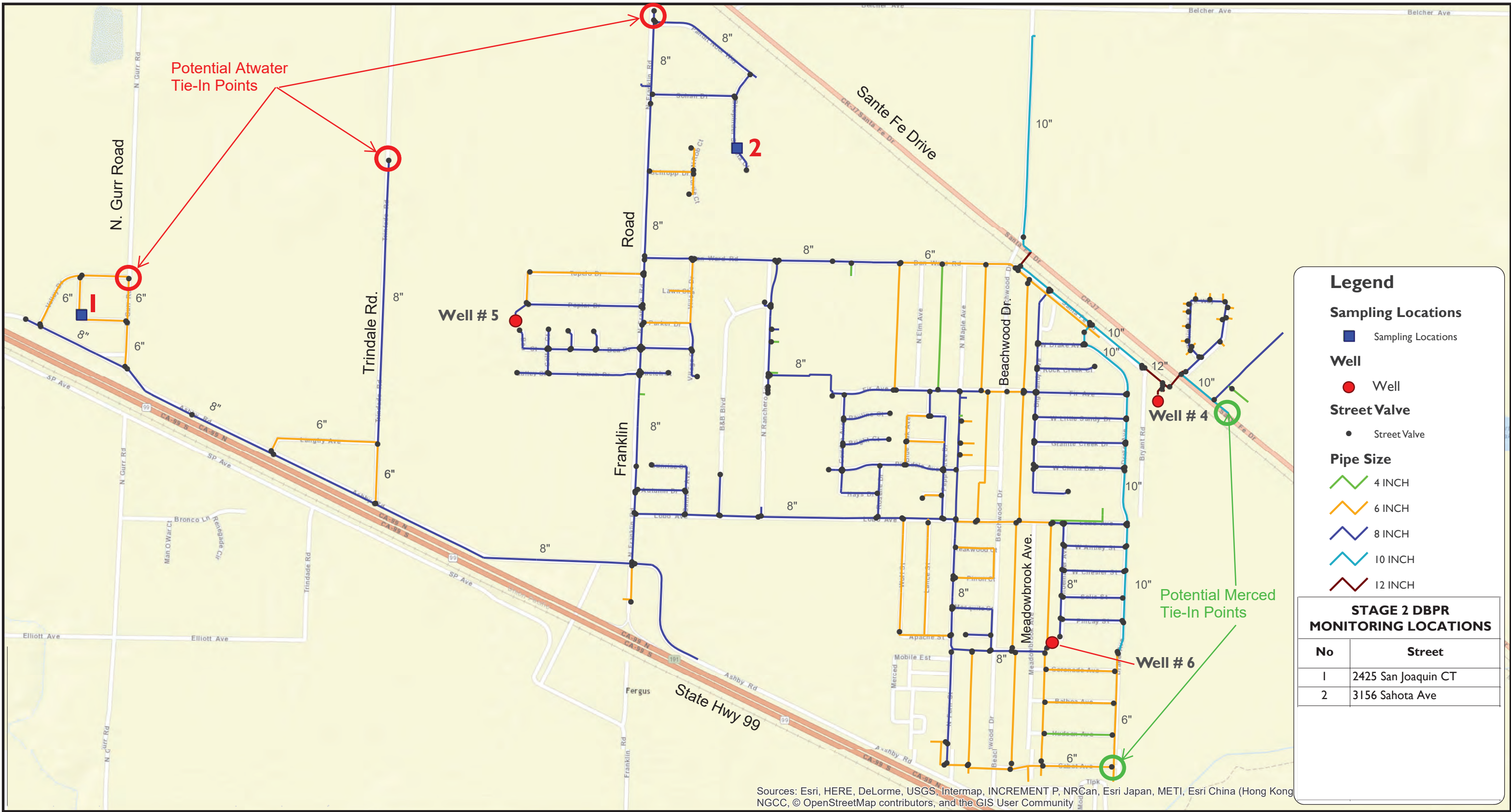
Tshuaj Tsau Dlej  
Chlorination:

Txhua lub qhovdlej muaj cov tshuaj chlorination.

Cov System muaj:

Xyoo	Txhua Xyoo Taagnrho (MG)	ntxiv rua lub hlis siv ntau (ADD in Max Month)	MDD (gpm)	MDD (gallons)	PHD (gpm)
2018	317.266	871	1,305	1,881,000	1,958





# MEADOWBROOK DISTRIBUTION SYSTEM



POTENTIAL CONNECTION POINTS

FIGURE I

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# Evaluation of Meadowbrook System

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## California Kev Siv Dlej Tug Qauv Qha

- Dlej rua pejxeem siv muaj txausnkaus puvnpo rua txujkev siv ntawm ib nubtwg.
- Rawsle lub Xeev State DDW hab AWWA, yuav muaj dlej siv txaus txhua nub losyog yuav ncuva dlej tej lub sijhawm thaum cov qhovdlej luj nqeg.
- Yog cov qhovdlej txuas txug 1,000, lub qhovdlej yuav ncuva le 4 teev tu dlej tsi tau dlej siv.

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## Evaluation of Meadowbrook System

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- Meadowbrook ntim tau taagnrho 3,590 gpm hab 1,790 gpm nrug rua qhovdlej luj (Qhovdlej 4) tuag lawm. Ntxiv ntawd, yuavtsum muaj dlej ntim kom muaj txaus siv thaum muaj kubnyab, suavtawg xub tuag, hab muaj dlej nyaab, naag xub naag cuab ntaus. Yuavtsum saib kom muaj le nraag nuav:
  - Yuavtsum muaj dlej txaus siv nub siv ntau thaum lub qhovdlej luj tuag.
  - Yog lub chaw khaws dlej tsi txaus siv rua thaum titeg titaw, kubnyab, hab siv. Qhovdlej yuavtsum txaus siv rua lwm yaam.
  - Yog tsi muaj suavtawg xub txaus thaum suavtawg tuag, cov tsi txuas suavtawg xub yuavtsum muaj siv.

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## Evaluation of Meadowbrook System

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- Yog tsi muaj dlej txaus siv thaum sijhawm siv ntau, thaum dlej tsawg yuavtsum muaj dlej tom qhovdlej.
- Yuavtsum khaws dlej tseg kom txaus siv thaum muaj khub nyab.
- Yog cov dlej ntim ca tsi txaus PPD sijhawm suavtawg xub tuag, cov qhovdlej kws tsi siv suavtawg xub yuavtsum txaus siv. Yog thaum suavtawg xub tuag lawm es yuav kawm tsevkawmntawv, tsev uakaam. Txawm yog cov kws tsi siv suavtawg xub los thaum ntawd yuav siv tsi tau.



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## Evaluation of Meadowbrook System

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- Tej chaw ntim dlej miv yuavtsum siv tau thaum nub muaj kev kubnyab. Qhov dlej miv yuav tsum muaj kom txaus siv nub siv ntau hab tshuav dlej lug tua suav tawg kub ntxhuv. Qhov nuav yuav tsum muaj txau thaum lub qhov dlej luj tuag. Yog kub nyab, yuav tsum muaj 1500 gpm lug tua suav tawg. Cov kev saib nuav muab lug siv saib Meadowbrook cov dlej hab saib yuav ntxiv dlej le caag huv qaab nuav.

# Evaluation of Meadowbrook System

## Key Soj Saib Meadowbrook Cov Dlej

Saib	Meadowbrook Cov Dlej Ndlwg lecaag (gpm)	Qha
Faib cov nub ntawm lub hlis ntau dlua	871	--
Kev siv puvnpo ntawm ib nub	1,305	--
Kev ncu ntawm tejteev	1,958	--
Kev siv suavtawg	1,500	--
Siv puvnpo ntawm ib nub nrug 1,5000-gpm fire flow	2,805	--
Taagnrho qhovdlej ntim tau	muaj 3,590	Tau txhuas yaam
Taagnrho cov qhovdlej ntim kws nrug rua cov qhovdlej luj kws txav hluas lawm	muaj 1,790	168 gpm tsawg rua lub sijhawm siv dlej heev 1,015 gpm tsawg rua nub siv dlej heev hab tseem khaws tau dlej ca
Muaj peev xwm ntim cia	muaj 0 available	Khaws Tsi tau

# Evaluation of Meadowbrook System

## Kev Soj Saib Meadowbrook Cov Dlej

Saib	Meadowbrook Cov Dlej Ndlwg lecaag (gpm)	Qha
Tsi muaj suavtawg	muaj 1,800 <sup>1</sup>	158-gpm tsawg rua lub sijhawm siv dlej heev 1,005 gpm tsawg rua nub siv dlej heev hab tseem khaws tau dlej ca
Ntim tau dlej ca rawsle ADD kom ntau rua ib hlis thaum muaj kev puastsuaj	yuavtau muaj 871 muaj 0	Tsawg 871 gpm

<sup>1</sup> Yog muaj 4 lub qhovdlej muaj lub generator nyob ntev moog, lub generator qhab lug ntxiv rua qhovdlej 5 hab 6 (1,790 gpm).

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## Evaluation of Meadowbrook System

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- Raws le kev saib sau nuav, cov dlej nuav yuav zoo yog ntxiv 1000 gpm txua dlej lug. Yog muaj 25 feem pua ntxiv nce 250 7pm, kom muaj 1250 gpm yuav paab tau cov dlej Meadowbrook.

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## Benefits and Purpose of Intertie

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- **Paab Thaum Titeg Titaw:** Thaum xwmtxheej kubntxuv (earthquake, fire, terrorist action) qhovdlej tuag, qhov 1,250 gpm ntxiv yuav paab tau kev siv dlej zoo.
- **Nub Sijhawm Siv Ntau:** Peak Day/Hour Supply: Ntxiv dlej paab tau thaum dlej tsawg 170 gpm lub sijhawm siv dlej ntau.

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## Benefits and Purpose of Intertie

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- **Qhovdlej SibPaab:** Qhov ntxiv dlej nuav yuav paab zoo rua 3 lub qhov dlej miv thaum faisfab tuag.
- **Kubnyab:** Qhov ntxiv dlej 1250 gpm nrug lub qhov dlej 5 hab 6 (taag ntsho 3040 7pm) yuav paab tua suav tawg txug 1500 7pm thaum nub siv dlej ntau (txug 3805 7pm) yog lub qhov dlej luj tuag.



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## Benefits and Purpose of Intertie

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- **Paab Txuas YaavPegsuab:** Qhov ntxiv dlej 1250 gpm yuav ntxiv tau 250 gpm rua 200 lub chaw siv dlej txug 1.17 gpm sijhawm siv dlej ntau.
- **Nce Kom Muaj Zug:** Qhov ntxiv dlej 1250 gpm yuav paab pejxeem thaum nub siv ntau hab tshuav 1500 gpm lug ca rua kev kub nyab yog lub qhov dlej luj tuag. Kev can yuav tsum muaj 20 psi.

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## Benefits and Purpose of Intertie

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- **Dlej Huv:** Yog muaj ib losyog ntau lub ntawm peb lub qhovdlej tsi huv (nitrates, TCP, PCE, DBCP, arsenic, etc.) yuav tau muab kaw es tu kom huv maam rov qheb siv.

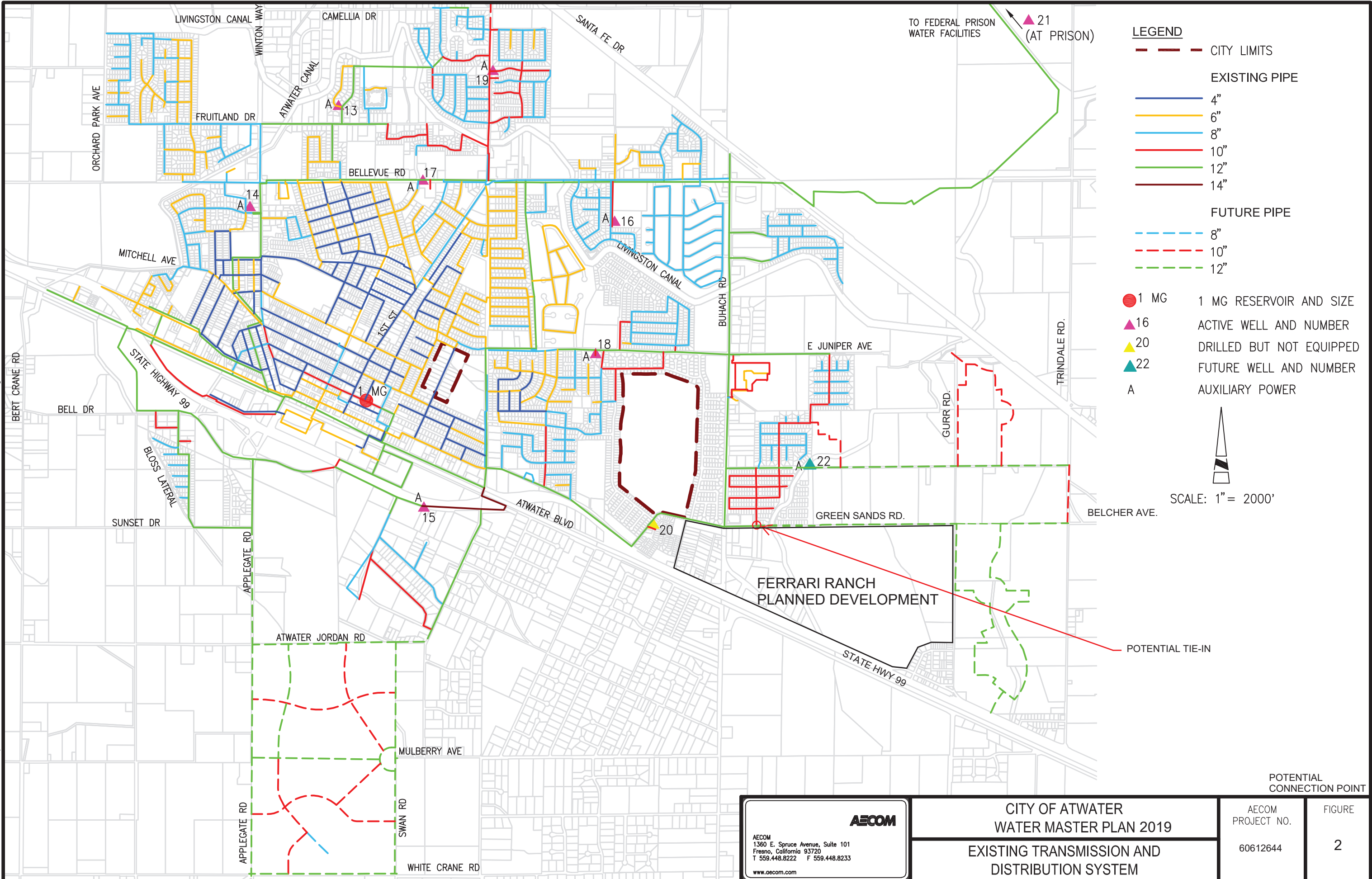
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# City of Atwater Water System

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- Cov qhovdlej najnub siv muaj: 8
- Cov txuas siv muaj: Kwvyees 5,460
- Npaaj tseg muaj txawmpeem: 1.5 MG tom Atwater
- Ntim taug: 15,500 gpm
- Tshuab Generators Faaj Titeg Titaw muaj : 7 Qhovdlej

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 USER: deandab



- LEGEND**
- CITY LIMITS
  - EXISTING PIPE**
  - 4"
  - 6"
  - 8"
  - 10"
  - 12"
  - 14"
  - FUTURE PIPE**
  - 8"
  - 10"
  - 12"
  - 1 MG 1 MG RESERVOIR AND SIZE
  - ▲ 16 ACTIVE WELL AND NUMBER
  - ▲ 20 DRILLED BUT NOT EQUIPPED
  - ▲ 22 FUTURE WELL AND NUMBER
  - A AUXILIARY POWER

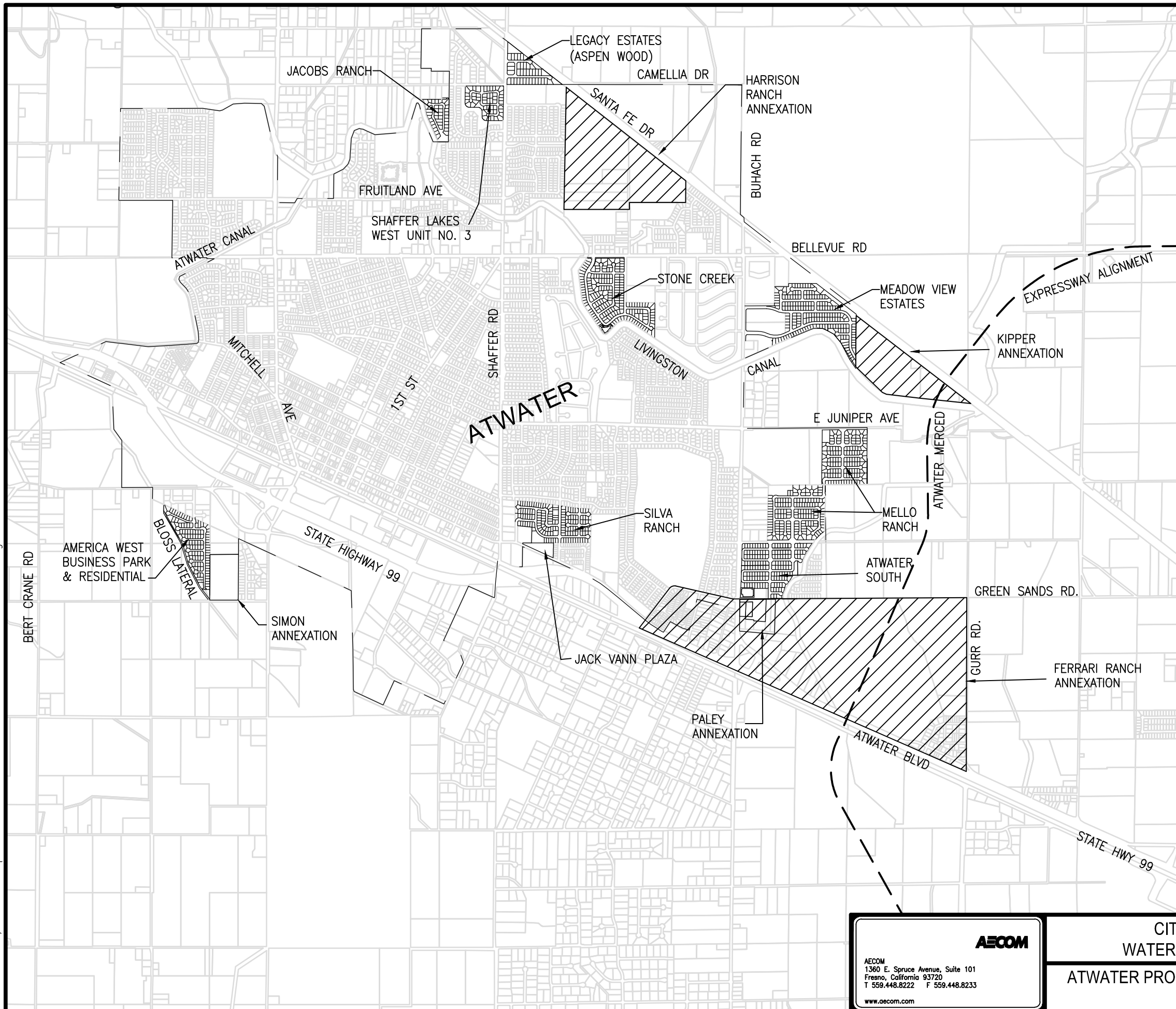
SCALE: 1" = 2000'

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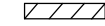
**CITY OF ATWATER  
 WATER MASTER PLAN 2019**  
**EXISTING TRANSMISSION AND  
 DISTRIBUTION SYSTEM**

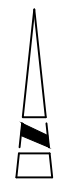
POTENTIAL CONNECTION POINT	
AECOM PROJECT NO.	FIGURE
60612644	2

DWG: K:\Projects\Merced Irrigation District\60612644\_Meadowbrook Inter tie Study\900\_CAD\_GIS\910\_CAD\02-Sheets\City of Atwater Water MP.dwg  
 DATE: Mar 09, 2020 4:45pm XREFS: c-base G--BD11x17h AECOM--logoFR IMAGES: SD-10.tif USER: Phillip.Boren



### LEGEND

-  EXISTING OR FUTURE DEVELOPMENT LOT LAYOUT
-  NEW DEVELOPMENT LOT LAYOUT
-  PROPOSED ATWATER - MERCED EXPRESSWAY
-  PENDING AND RECENT ANNEXATION



SCALE: 1" = 2000'

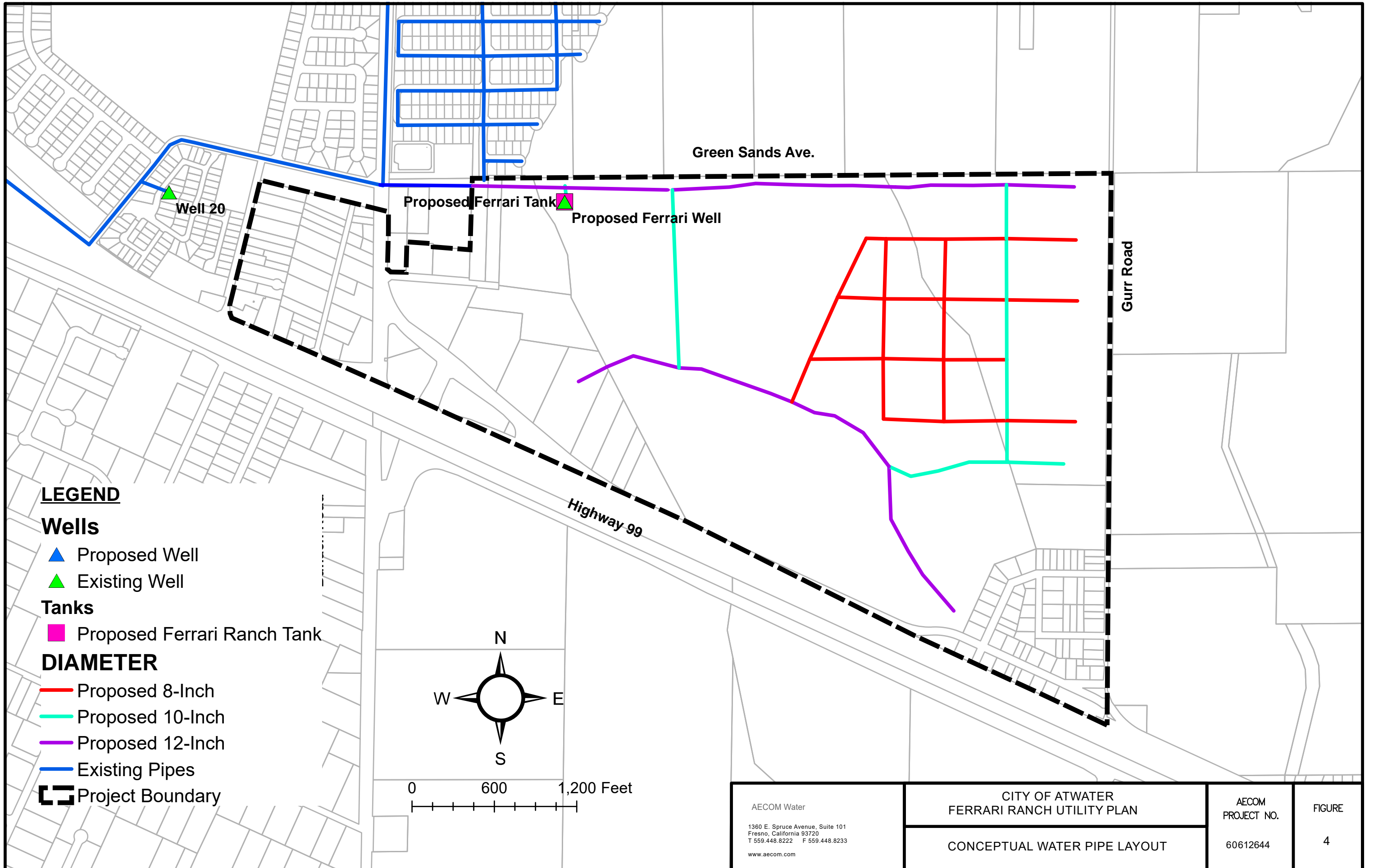
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**CITY OF ATWATER**  
**WATER MASTER PLAN 2019**  
**ATWATER PROPOSED DEVELOPMENTS AS**  
**OF 2018**

AECOM  
 PROJECT NO.  
 60612644

FIGURE  
 3





**LEGEND**

**Wells**

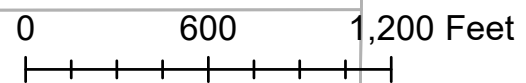
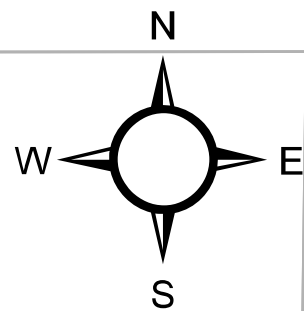
- ▲ Proposed Well
- ▲ Existing Well

**Tanks**

- Proposed Ferrari Ranch Tank

**DIAMETER**

- Proposed 8-Inch
- Proposed 10-Inch
- Proposed 12-Inch
- Existing Pipes
- Project Boundary



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CITY OF ATWATER  
 FERRARI RANCH UTILITY PLAN

CONCEPTUAL WATER PIPE LAYOUT

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60612644

FIGURE

4



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## Storage Evaluation per Atwater Master Plan

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- Rawsle saib qha ntawm Rooj 7 has tas, Atwater muaj 2.2 MG tsawg cov lug siv thaum muaj kev kubnyab titeg titawg
- Txawm le hom los, tseem muaj qhovdlej 21, 0.5-MG ntim ca, hab ib qhov chaw ntim tom tsoomfwv tsev lojfaab kws tom Atwater thaum kev Titeg Titaw.

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# Well Supply Evaluation per Atwater Master Plan

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- Lub sijhawm: 17,570 gpm
- Qhovdlej thaum lub qhovdlej tuag<sup>1</sup>: 11,300 gpm
- Ntim tau dlej ca<sup>2</sup>: 3,000 gpm
- Ntim tsi tau dlej txaus<sup>3</sup>: (3,270 gpm)

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<sup>1</sup> Qhovdlej tsi suav txug lub qhovdlej 21 hab qhovdlej 17 (lub qhovdlej luj).

<sup>2</sup> Muaj 1-MG lub thawv ntim nce 2,500 gpm ntxiv rua ib ntawm ob lub 0.5-MG paag ntim dlej tom tsev lojfaab ntim 500 gpm. Muaj 0.5-MG MG paag siv rua tsoomfwm tsev lojfaaj.

<sup>3</sup> Yog dlej tsawg yuavtau qhovdlej 20 (2,000 gpm) thaum muaj dlej losyog siv dlej tom tsoomfwv tsev lojfaaj (1,270 gpm)..

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# Well Supply Evaluation per Atwater Master Plan

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- Saib dlej nub siv ntau thaum tsi muaj lub qhovdlej luj sijhawm suavtawg xub tuag.

**Muaj txawmpeem siv rua xyoo (2018)  
(Nub siv dlej ntau kws tsi siv lub qhovdlej luj) Thaum Suavtawg Xub tuag (gpm)**

Lub Zejzog Cov Nub Siv Dlej Ntau	10,910
Muaj qhovdlej (10,100 gpm) <sup>1</sup>	10,100
Muaj Chaw Ntim Dlej <sup>2</sup>	3,000
Zejzog Muaj Chaw Khaws dlej ntau tshaaj	2,190

<sup>1</sup> Qhovdlej ntim tsi siv hom qhovdlej 21 hab hom qhovdlej luj 17, hab cov qhovdlej kws tsi siv lub generators (qhovdlej 13).

<sup>2</sup> Muaj 1-MG nrug rua ib ntawm ob 0.5-MG ntim khaws dlej tom tsev lojfaaj.

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# Well Supply Evaluation per Atwater Master Plan

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- Saib kom muaj dlej txaus siv rua nub kws siv dlej ntau kom muaj 3,000-gpm txaus
  - Ntau Txug = 13,910 gpm
  - Muaj Siv 11,300 gpm + 3,000 gpm Ntim Khaws Tseg = 14,300 gpm
- Rawsle qha nuav, Atwater yuav muaj dlej 2,190 ntau siv rua nub siv dlej ntau kws kaw lub qhovdlej luj.

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# City of Atwater Water System

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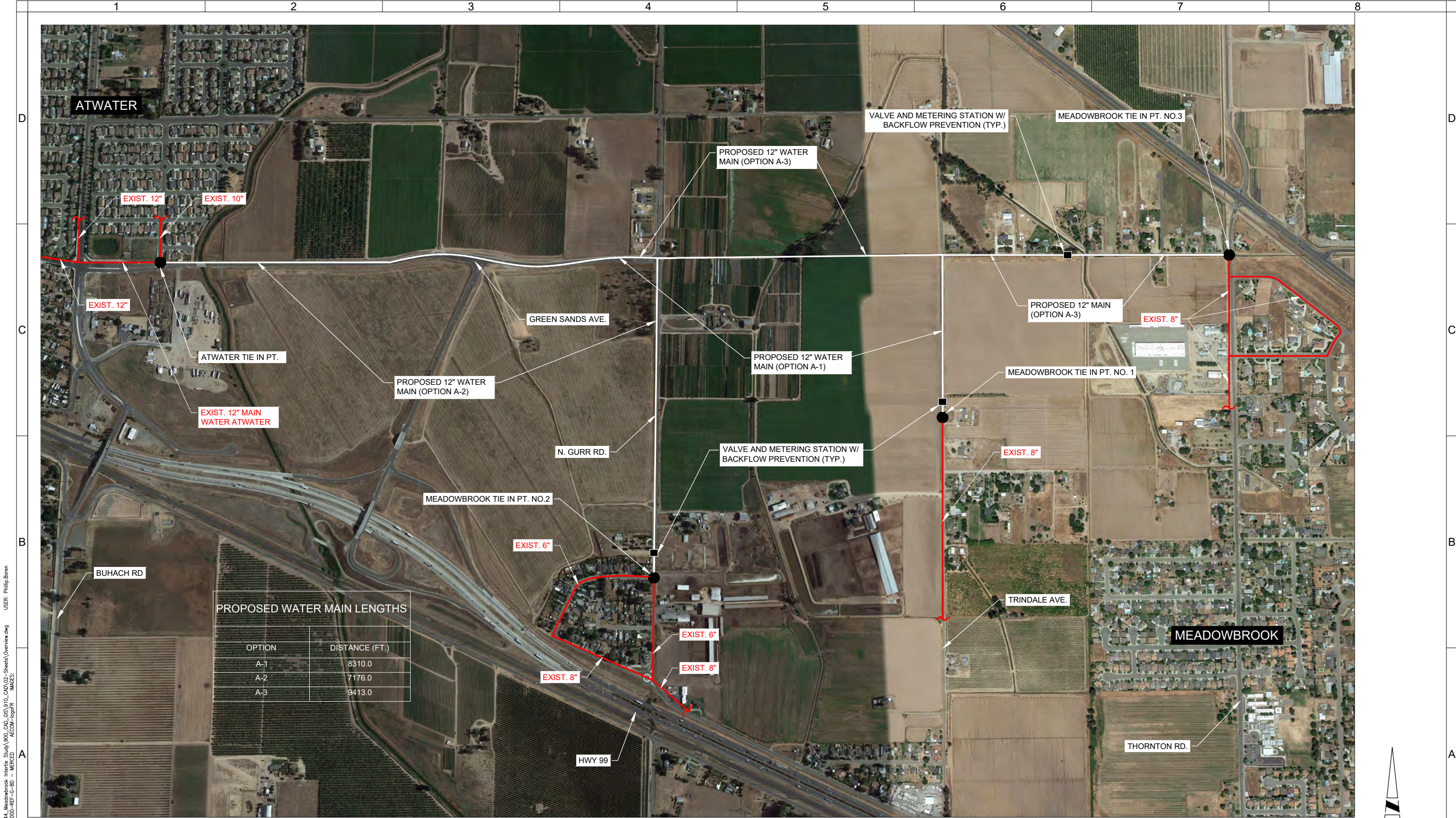
Qauv Qha 5 qha peb qho options, nrug rua A-2 nyam dlua.

## Cuabyeej muaj txawjpeem (2018)

(Ntawm ib nub kws yog tsi muaj qhovdlej luj) Thaum tsi muaj Suavtawg Xub (gpm)

Qhov	Luj tsau teg (in.)	Ntev kutaw (ft)	Zug Tsawg 1,250 gpm (psi)	Kaav Txuas Luj
A-1	12	8,310	18	lb 8-in. dia.
A-2	12	7,176	16	Ob 6-in. dia.
A-3	12	9,413	19	lb 8-in. dia.





**PROPOSED WATER MAIN LENGTHS**

OPTION	DISTANCE (FT.)
A-1	8310.0
A-2	7176.0
A-3	9413.0

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 DATE: Mar 10, 2020 10:20am  
 USER: Phillip.Boren  
 XREFS: 00000000 - REF - C - BD - MFCED  
 AECOM - logdfr IMAGES:

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IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	CHECKED BY	PROJECT NUMBER      60612644
	DATE	CADD STANDARDS      AECOM
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MEADOWBROOK  
**ATWATER/MEADOWBROOK  
 POTENTIAL CONNECTION POINTS**

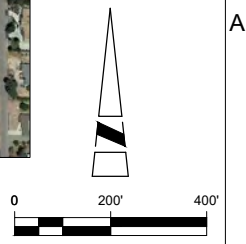


FIG. 5



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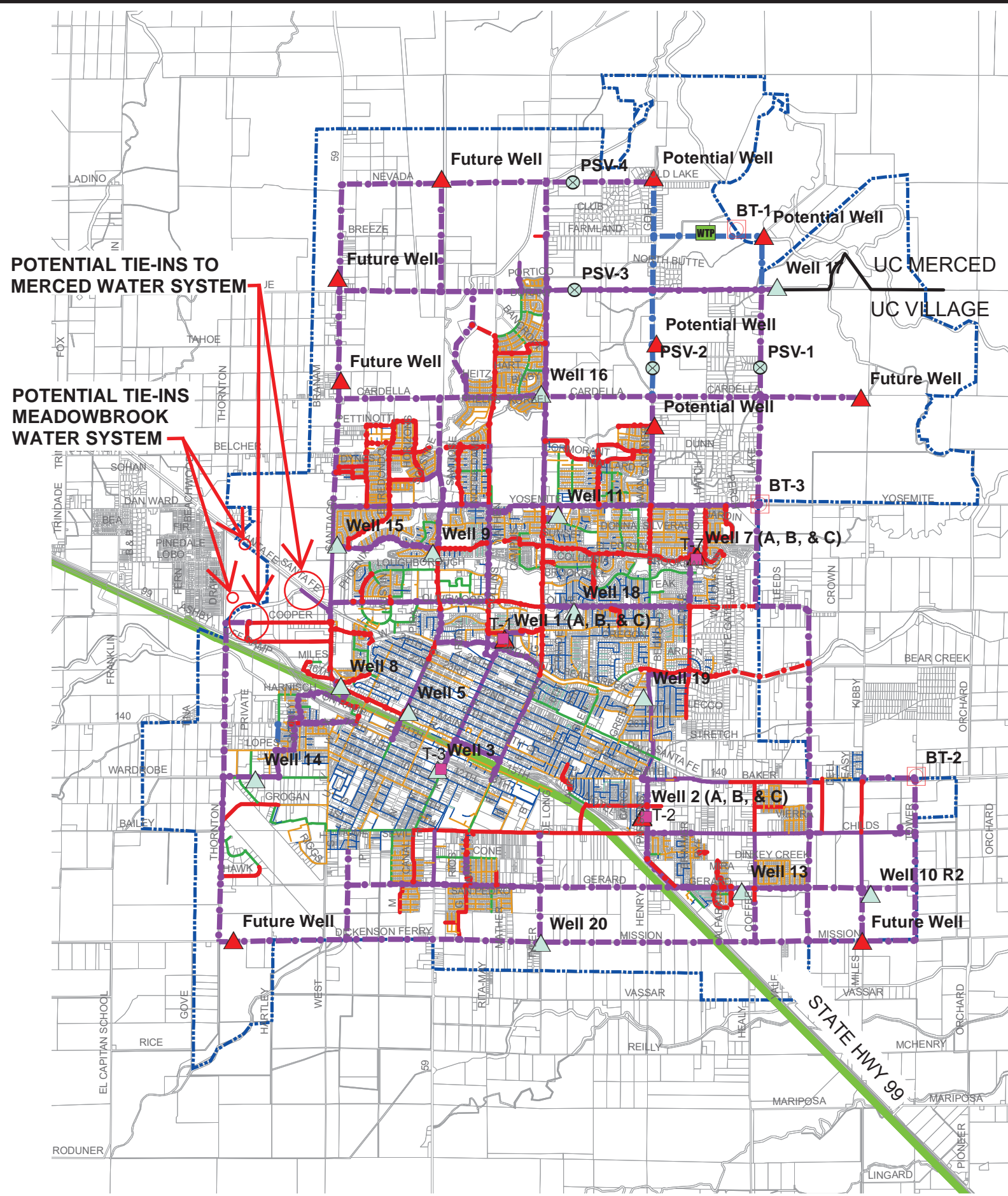
# City of Merced Water System

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- Cov qhovdlej tseem siv tau muaj: 20
- Kev paab txuas: 21,523
- Chaw ntim maul: 1MG
- Chaw ntim taus: 54,400 gpm<sup>1</sup>
- Tshuab Faajseeb generators: Taagnrho cov qhovdlej

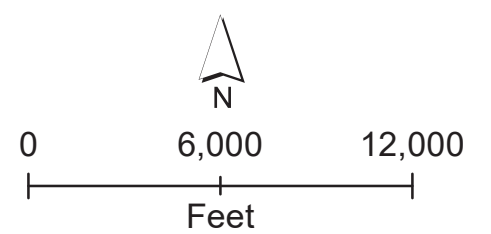
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<sup>1</sup> 59,400 gpm thaum ob lub qhovdlej tshab ua tav.



**LEGEND**

- Existing Tank
  - ▲ Existing Wells
  - ▲ Future Wells
  - 2030 Booster Pump
  - ⊗ 2030 Pressure Sustaining Valve
  - WTP Water Treatment Plant
- Existing Pipelines**
- 4 in.
  - 6 in.
  - 8 in.
  - 10 in.
  - 12 in.
  - 16 in.
  - 18 in.
- 2030 Pipelines**
- - - 12 in.
  - - - 16 in.
  - - - 18 in.
  - 12
  - 16
- Future High Speed Rail Alignment
  - - - Merced Vision 2030 Boundary



AECOM Water 1360 E. Spruce Avenue, Suite 101 Fresno, California 93720 T 559.448.8222 F 559.448.8233 www.aecom.com	CITY OF MERCED WATER MASTER PLAN 2015		AECOM PROJECT NO.	FIGURE
	RECOMMENDED WATER SYSTEM IMPROVEMENTS		60612644	6

# City of Merced Water System

## Cov Dlej Muaj Nyob Huv Zog Merced hab Nqug Ntim Tau

Najnpawb Qhovdlej.	Muaj Chaw Ntim , gpm	Nub Siv Ntau , gpm <sup>1</sup>	Sijhawm Tu ncu, gpm
1A	2,200		
1C	2,200		
2A	2,200		
2B	2,200		
2C	2,500		
3C	3,000		
5B	3,000		
7C	2,800		
8	2,000		
9	1,800		
10R2	3,000		
11	3,000		
13	3,000		
14	4,000		
15	3,500		
16	3,500		

# City of Merced Water System

## Cov Dlej Muaj Nyob Huv Zog Merced hab Nqug Ntim Tau

Najnpawb Qhovdlej.	Muaj Chaw Ntim , gpm	Nub Siv Ntau , gpm <sup>1</sup>	Sijhawm Tu ncu, gpm
17	2,500		
18	3,000		
19	2,500		
20 (taabtom khu)	(2,500)		
21	2,500		
22 (taabtom khu)	(2,500)		
<b>Taagnrho Ntim Taug</b>	<b>54,400<sup>3</sup></b>		
<b>Taagnrho Ntim Tau<sup>2</sup></b>	<b>50,400</b>	<b>34,508</b>	<b>44,960</b>

<sup>1</sup> Nub siv dlej ntau yog siv txug 30,508 gpm hab tseg 4,000 gpm npaaj tua suavtawg ntawm xyoo 2012.

<sup>2</sup> Has txug thaum cove qhovdlej tuag siv tsi tau lawm. Thaum zoo le nuav qhovdlej 14 yog lub luj tshaaj yuav tsi nqug dlej.

<sup>3</sup> Yuav ntim tau 59,400-gpm thaum ua tav.

# Storage Evaluation per Merced Master Plan

## Saib Txug qhov Muaj hab Ntim Tau rua Merced Siv

Muaj Chaw Ntim, MG	Timtsum Chaw Ntim, MG				Ntim Kom Tshaaj <sup>3</sup> (MG)
	Npaaj Ca	Suavtawg Kub	Titeg Titaw	Taagnrho	
44.96 <sup>1</sup>	13.35	0.96 <sup>2</sup>	23.40	37.71	7.25

<sup>1</sup> Muaj chaw ca ntim qhovdlej qaab aav. Rawsle 80% ntawm Zejzog cov qhovdlej rhu tawm kev siv txhua nub. 20% ntawm cov qhovdlej kws tuag.

<sup>2</sup> Rawsle lub chaw muaj suavtawg dlha 4,000 gpm dlha txhua sijhawm 4 teev.

<sup>3</sup> Muab xaam ca rhu tawm qhov muaj.

➤ Ntim tau ntau dlua = 7.25 MG

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## Demand Analysis

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- Nub siv ntau: Hum nub siv ntau 3,000 gpm fire flow per dclaim homphaj Master Plan analysis.
- Xuabmoos Siv Ntau: Hum Xuabmoos siv ntau ntawm dclaim qauv Master Plan analysis.



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## Merced Water System Excess Capacity

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- Merced muaj dlej ntau dlua 15,782 gpm<sup>1</sup> thaum nub siv ntau muaj kubnyab suavtawg tuag.
- Merced muaj dlej ntau dlua 5,440 gpm<sup>2</sup> thaum sijhawm siv ntau.

---

<sup>1</sup> 20,892 gpm thaum qhovdlej 20 hab 22 tav hab tau siv lawm.

<sup>2</sup> 10,440 gpm thaum qhovdlej 20 and 22 tav hab tau siv lawm.

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## Merced Intertie Locations

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Qauv Qha 7 qha ob qhov, lb qhov you M-1.

### Qhov Ntxiv Dlej rua Zog Merced

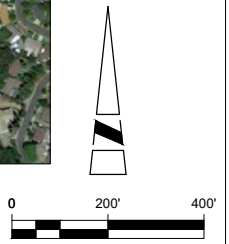
Qha	Luj Tsau teg (in.)	ntev kutaw (ft)	Zug Tsawg (Pressure Loss) 1,250 gpm (psi)	Kaab Luj Txuas
M-1	12	3,612	10	lb 10-in. dia
M-2	12	1,511	7	Ob 6-in. dia





PROPOSED WATER MAIN LENGTHS

OPTION	DISTANCE (FT.)
M-1	3612.0
M-2	1511.0



REV	DATE	DESCRIPTION	APPR

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 POTENTIAL CONNECTION POINTS

FIG. 7

DWG: K:\Projects\Merced Irrigation District\60612644\_Meadowbrook Inertia Study\900\_CAD\_GIS\910\_CAD\02\_Sheets\Overview.dwg  
 DATE: Mar 10, 2020 2:37pm  
 USER: Phillip Boren  
 XREFS: 0000000-REF-C-BD - MERCED  
 AECOM-logofR IMAGES:



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# Estimated Construction Costs for Interties

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➤ Atwater

- Theem Option A-1: \$2,257,400
- Theem Option A-2: \$1,994,500
- Theem Option A-3: \$2,601,500

➤ Merced

- Theem Option M-1: \$1,185,800
- Theem Option M-2: \$ 764,300